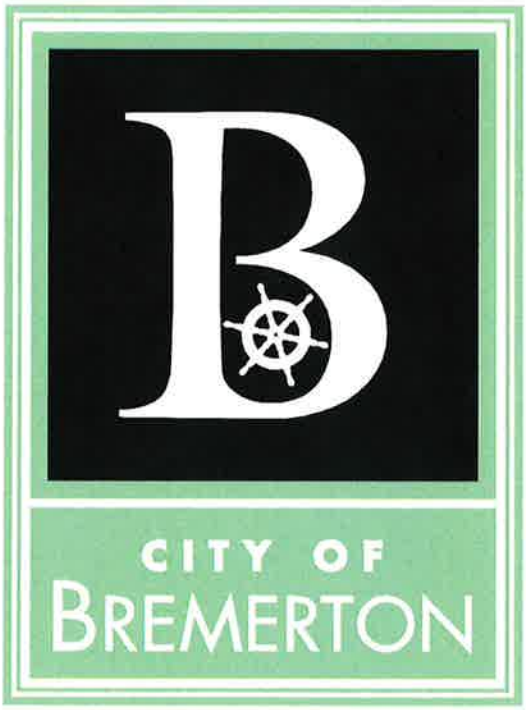


CITY OF BREMERTON
DEPARTMENT OF PUBLIC WORKS AND UTILITIES
COMBINED SEWER OVERFLOW ANNUAL REPORT FOR 2018

NPDES PERMIT #WA-002928-9

SUBMITTED TO WASHINGTON DEPARTMENT OF ECOLOGY

May 08, 2018

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In 2018, the City of Bremerton continued to improve and update its wastewater collection system. All of the CSO projects were completed by the end of 2009. The **19-year, $50+ million dollar CSO Reduction Program** achieved 99% reduction in the frequency and volume of CSOs. Bremerton joins only three other Washington State communities in celebrating completion of all its planned CSO Reduction projects.

This milestone was achieved by completing all stormwater separation, sanitary sewer system upgrades, operational changes, and private property stormwater separation projects identified in the CSO Reduction Plans.

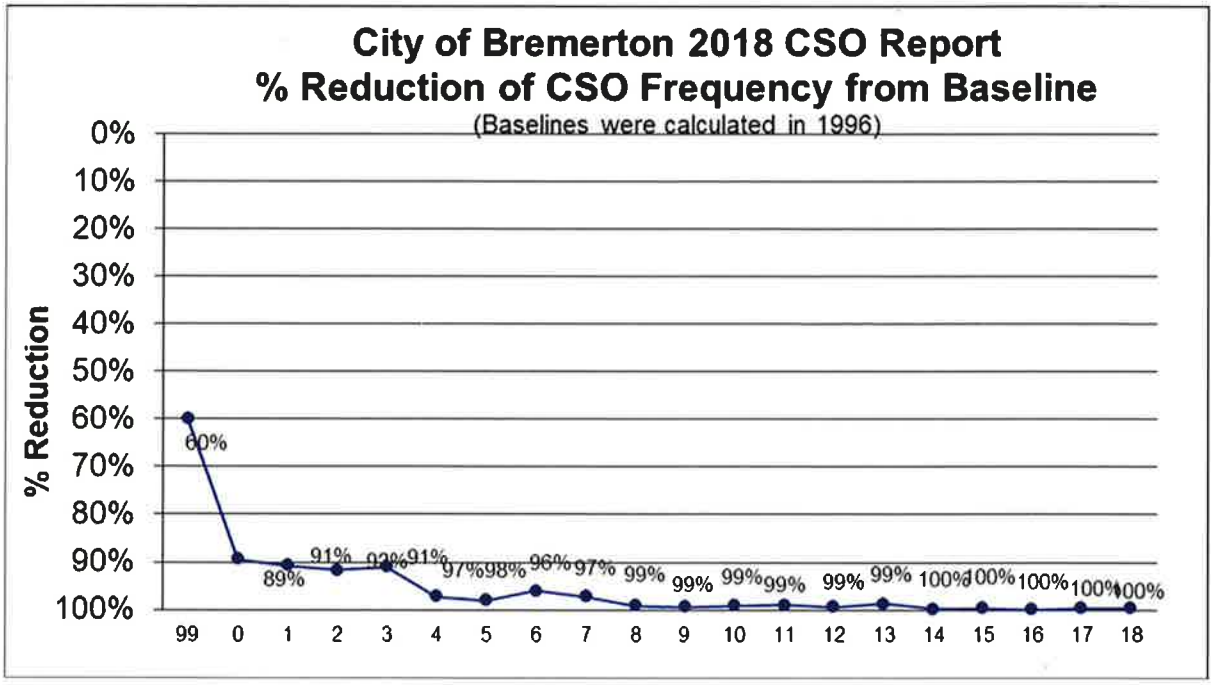
Chapter 173-245-090 of the Washington Administrative Code requires submittal of an annual CSO report by May 31. The following information is included in this Annual CSO Report:

- CSO Event, Duration, Volume, Precipitation, Storm Duration
- CSO Event Volume and Frequency monitored in 2018
- Summary of CSO Reduction projects completed to meet federal and state requirements
- Summary of the 20-year moving average, with the number of CSO events per outfall, and calculated once annually
- Eastside Plant yearly averages of TSS removal efficiency and effluent settleable solids

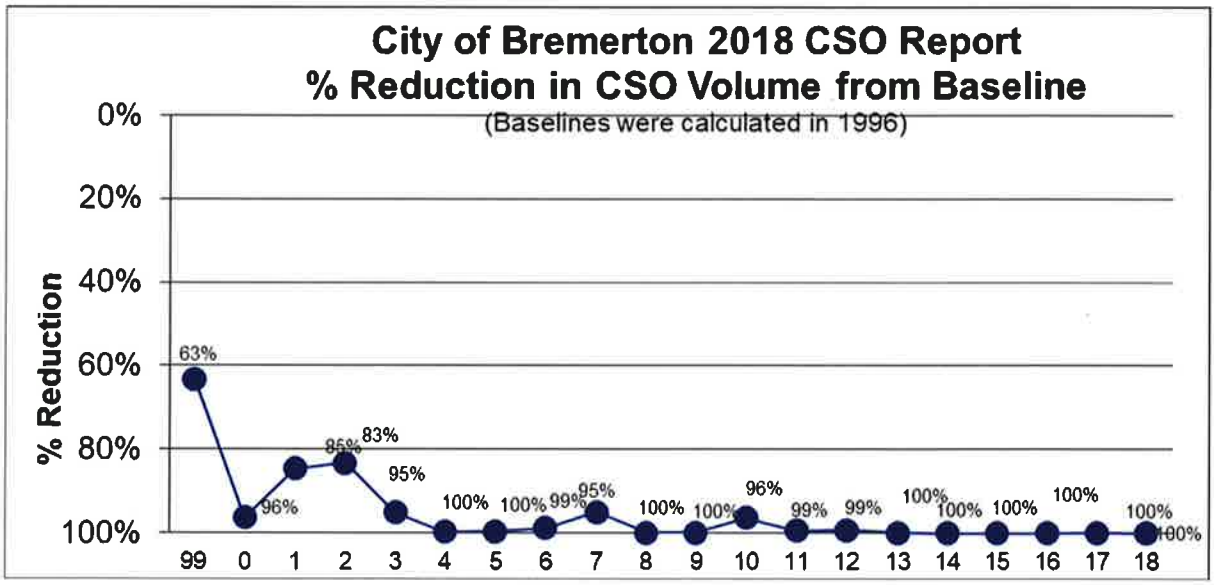
In 2018 the City of Bremerton:

- Is in compliance with CSO reduction requirements at all 15 sites
- Reduced overflow volume by 99%
- Reduced frequency of events by 99%
- Continued its public education and assistance program to involve citizens of Bremerton with CSO Reduction and provided education on water pollution prevention

The chart below illustrates the reduction of overflow frequency as a result of combined sewer system improvements by comparing the frequency baseline with recorded CSO data over the past 20 years.



The chart below illustrates the reduction of overflow volume as a result of combined sewer system improvements by comparing the volume baseline with recorded CSO data.



CSO frequency and volume baselines were calculated in 1996 using several years of monthly CSO data as measured at each CSO site. Baselines are used to monitor the progress and effectiveness of Bremerton's CSO reduction program. Percent reduction from baseline is calculated by comparing the CSO frequency and volume baselines with 2018's annual CSO event count and volume measured for all events.

1) Introduction

In 2018 The City of Bremerton continued to improve and update its wastewater collection system. All CSO projects were completed by the end of 2009. The **19-year, $50+ million dollar CSO Reduction Program** achieved 99% reduction in the frequency and volume of CSOs. Compliance with Washington Administrative Code 173-245 has been accomplished for all CSO sites.

This was achieved by completing all stormwater separation, sanitary sewer system upgrades, operational changes, and private property stormwater separation projects identified in the CSO Reduction Plans.

Chapter 173-245-090 of the Washington Administrative Code requires submittal of an annual CSO report by May 31. The following information is included in this Annual CSO Report:

- CSO Event, Duration, Volume, Precipitation, Storm Duration
- CSO Event Volume and Frequency monitored in 2018
- Summary of CSO Reduction projects completed to meet federal and state requirements
- Summary of the 20-year moving average, with the number of CSO events per outfall, and calculated once annually
- Eastside Plant yearly averages of TSS removal efficiency and effluent settleable solids

In 2018, the City of Bremerton's wastewater collection system contained 15 CSO sites. These structures are in the older portion of the City's wastewater collection system and some pre-date the first wastewater treatment plant built in 1946. CSO site locations are shown on the attached map (Attachment 1). All have outfall numbers assigned in the City's wastewater treatment plant (WWTP) NPDES permit.

Although the City has continually improved the wastewater collection system, a focus on CSO reduction planning began in 1989 in response to Department of Ecology (Ecology) regulations to limit CSOs into state waters. Ecology approved Bremerton's first CSO Reduction Plan in November 1992. A CSO Plan Update was completed in 2000 detailing recommended improvements for the City's wastewater collection system to reduce CSOs implemented through 2009. Ranking of improvement projects considered public health, cost effectiveness, safety concerns, overflow frequency, and infrastructure conditions. All proposed CSO reduction projects are identified in the City's CSO Reduction Plan Update and associated facility plans for wastewater collection system drainage basins.

Ecology issued an Order on Consent to the City in 1993 formalizing the schedule set forth in the City's CSO Reduction Plan. Also in 1993, the City settled a citizen's lawsuit with the Puget Soundkeeper Alliance (PSA), resulting in an agreement that included additional requirements such as CSO water quality monitoring and an accelerated construction schedule. CSO baselines and the implementation schedule were modified in an amended order in 2000.

On February 17, 2011 Ecology determined that all projects listed in the "Order on Consent" were completed and the agreement was terminated. On April 26th, 2011 the Puget

Soundkeeper Alliance (PSA) released the City from the "Consent Decree", and on May 11, 2011, the US District Court terminated the "Consent Decree" as requested by the City and PSA.

On June 29th, 2011 the City and PSA celebrated the end of the very successful CSO Reduction Program by inviting the public, local officials, program participants, and elected officials to a summary presentation of the programs accomplishments. The celebration was well attended and received by all.

The City continues to work with property owners to separate stormwater from the sanitary sewer system and target specific areas for further separation as needed to remain in compliance.

2) CSO Water Quality Impact Model

A CSO/Fecal fate and transport water quality model was developed by the US Navy and USGS as part of the US Navy's ENVVEST Program. The calibrated model indicates Bremerton's CSOs have no measurable effect on bacterial quality of the receiving waters in Sinclair and Dyes Inlets. The model provided the Washington State Department of Health with enough information to re-open shellfish beds in Dyes Inlet in 2003 for the first time since they were closed in the late 1960's.

3) CSO events

There were a total of four CSO events in 2018:

- February 18, 2018 - OF-9 (4,109 gals)
- April 28, 2018 - OF-3 (600 gals)
- April 28, 2018 - OF-10 (300 gals)
- December 11, 2018 - OF-1 (98,000 gals)

Three of the CSO events that occurred in 2018 were due to high intensity short duration rainfall events, which triggered the CSOs. The CSO event that occurred on December 11th was due to an equipment malfunction during a high intensity short duration rainfall event. The influent gate into the ESTP sheared the brass gears, and would not open, which caused the overflow. The cumulative total of gallons for the four CSO events was **103,009 gallons**.

4) Baseline Review and Update

CSO baselines provide volume and frequency levels for the system prior to implementing improvements. This allows Ecology to monitor the progress and effectiveness of Bremerton's CSO reduction program as set forth in Chapter 173-245 WAC.

In 1996, Bremerton established CSO baselines for each outfall. CSO frequency and volume baselines were calculated with a linear regression using several years of monthly rainfall and CSO data as measured at each CSO site. From this data, both the mean and upper 95% confidence intervals were established. Baselines are compared to measured overflow volume and frequency in the attachments to this CSO Report.

Percent reduction from baseline is calculated by comparing CSO frequency and volume baselines with 2018's annual CSO event count and volume measured for all CSO events. **Figure 1** illustrates the reduction of overflow frequency as a result of combined sewer system improvements by comparing the frequency baseline with recorded cumulative annual CSO data over the past 20 years of the program.

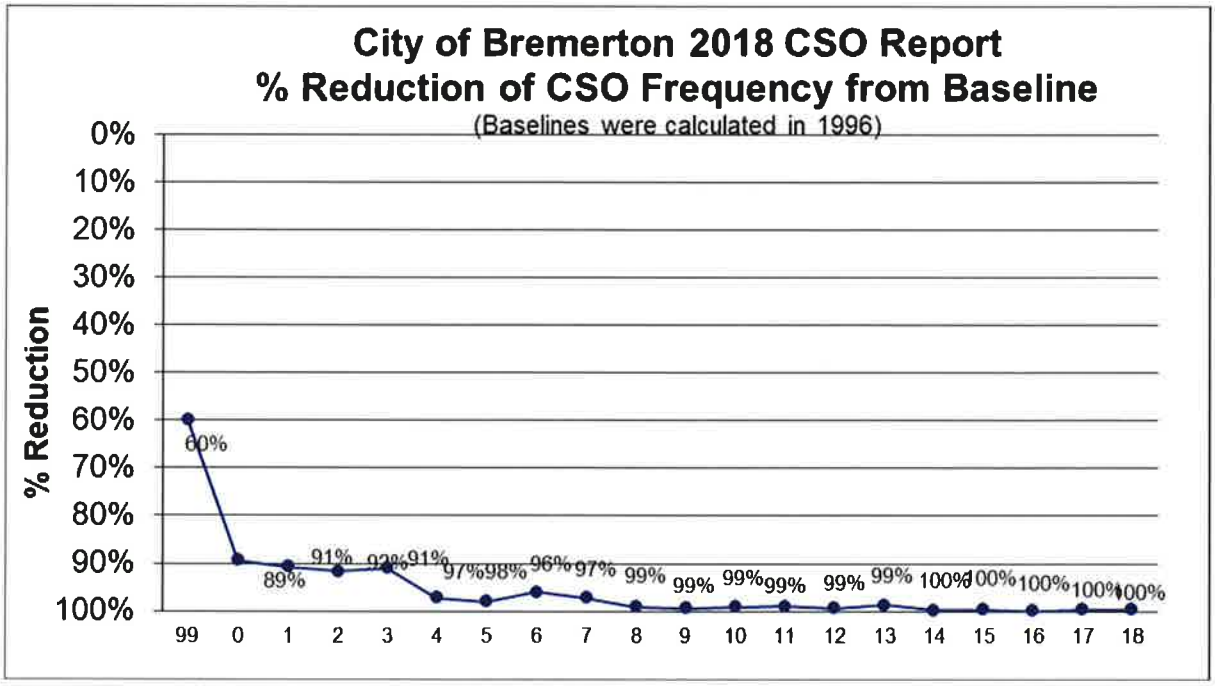


Figure 1 - Percent Reduction of CSO Frequency from Baseline

Figure 2 illustrates reduction of overflow volume as a result of combined sewer system improvements by comparing volume baseline with recorded cumulative annual CSO data.

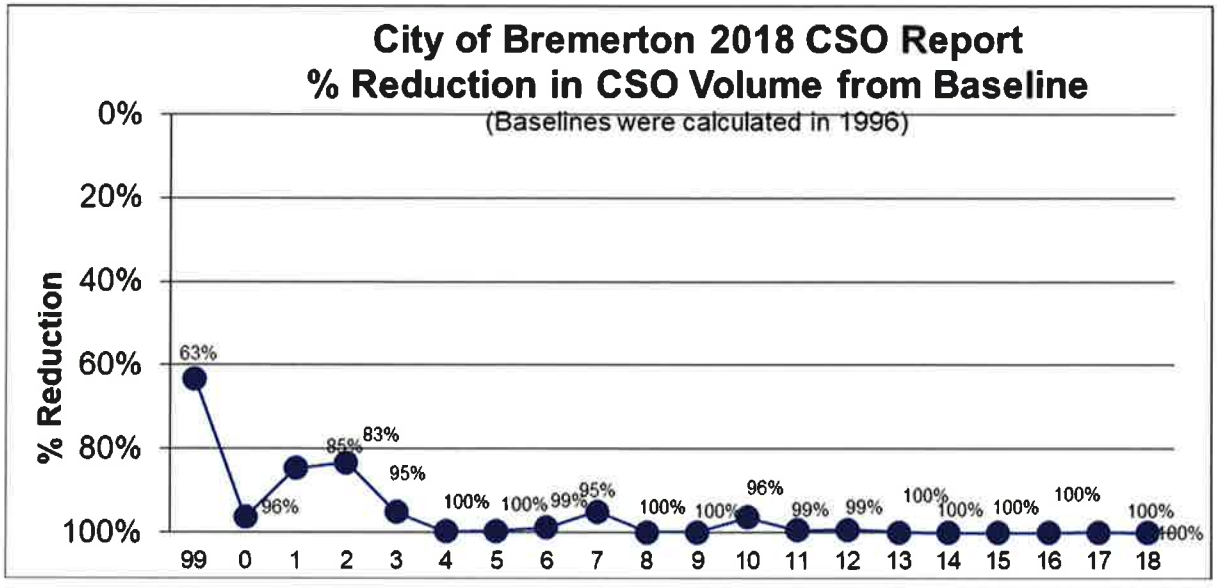


Figure 2 - Percent Reduction of CSO Volume from Baseline

Figure 3 is a comparison of overflow volume baselines to measured flows for all sites. This graphical presentation of measured CSO volume, compared to their respective baselines, show the success of the CSO reduction program in controlling and reducing CSO events.

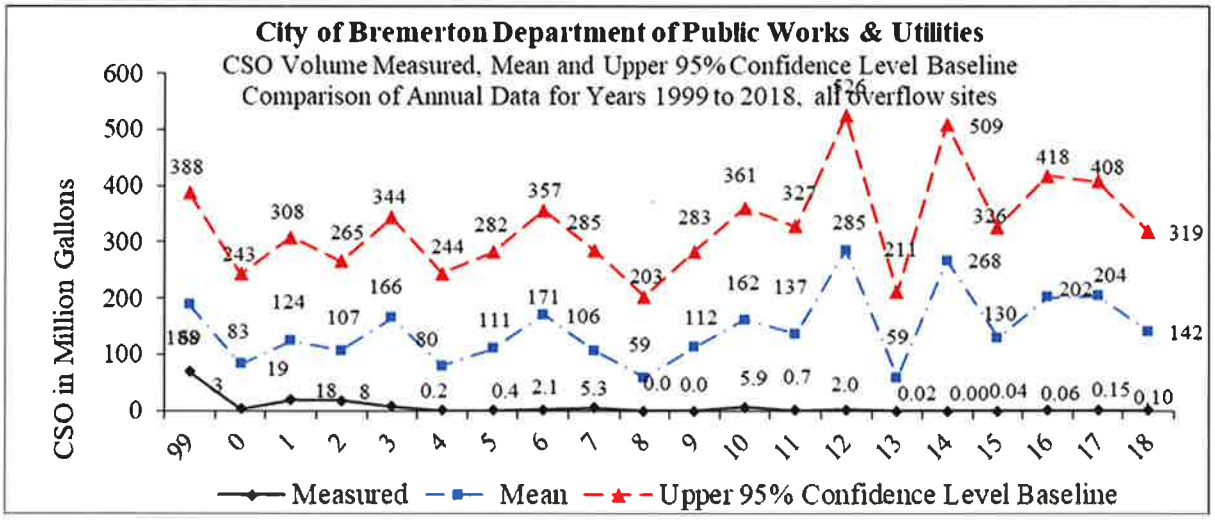


Figure 3 - CSO Volume Measured, Mean and 95% Confidence Level Baselines

The statistical analysis technique used to determine the *upper 95% confidence interval* provides a regulatory baseline for determining the CSO flow exceedance levels. In this report, the *mean* refers to the calculated volume or frequency of expected overflow using mean regression equations for each site. The *upper 95% confidence interval baseline* is derived from upper 95% confidence regression equations for each site. Monthly values for both equations will vary depending on the amount of precipitation.

5) CSO Flow Monitoring

Combined sewer overflow sites are continuously monitored with ultrasonic level monitoring equipment and CSOs are recorded as they occur. The fifteen overflow sites are connected to the Wastewater Treatment Plant and Supervisory Control Data Acquisition system (WWTP SCADA) so a storm event can be monitored in real-time. This allows an operator or the SCADA system to make adjustments to the wastewater collection system and maximizes the use of storage and pumping/treatment capacity. Continual improvements to the flow monitoring system have made it more reliable and versatile. The City has connected all of the 15 CSO flow meters to the WWTP SCADA system to complete a full integration of functions into one system. CSO flow meters are part of the associated wastewater pump station control system via WWTP SCADA. The operation of each station is monitored by SCADA and will notify an operator as soon as a station goes into an alarm state, such as a "high wetwell", which will occur prior to a CSO event. If a CSO occurs, the system will again notify an operator and other City staff so that corrective actions can be taken.

6) Requirements for Controlling CSOs

Ecology issued Bremerton its National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit, No. WA-0029289, with an effective date of December 1, 2018.

Section S9, COMBINED SEWER OVERFLOWS established reporting and compliance requirements as follows:

S9.D. *Requirements for Controlled Combined Sewer Overflows*

a. *The following is a list of combined sewer overflow (CSO) outfalls which are considered to have complied with the requirement of "greatest reasonable reduction" as defined in WAC 173-245-020(22). Frequency of overflow events at these CSO outfalls, as a result of and during precipitation events, must continue to meet the performance standard.*

b. *The performance standard for each controlled CSO outfall is no more than one discharge event per year on average per outfall, due to precipitation. Ecology will evaluate compliance with the performance standard annually based on a 20 year moving average, including past years and the current year. The Permittee must report the running 20-year average number of overflow events per year during this permit term from these CSO outfalls in the CSO Annual Report required in Condition S9.C.*

A CSO event is as defined in the Permit Writer's Manual (Page V-30), Department of Ecology Publication No. 92-109. The Department of Ecology defines the minimum inter-event period (MIET) for CSOs as 24 hours. A CSO event is considered to have ended only after at least 24 hours has elapsed since the last measured occurrence of an overflow."

OUTFALL NUMBER	BASIN	LOCATION	RECEIVING WATER
OF 1	Pine Road Basin	47.581490 -122.636958	Port Washington Narrows
OF 2	Stevens Canyon Basin	47.580579 -122.635489	Port Washington Narrows
OF 3	Cherry Avenue Basin	47.578031 -122.625189	Port Washington Narrows
OF 4	Eastpark Basin	47.571662 -122.619867	Port Washington Narrows
OF 6	Tracyton Beach Basin	47.585558 -122.646475	Port Washington Narrows
OF 7A	Trenton Avenue Basin	47.568998 -122.606821	Port Washington Narrows
OF 7B	Trenton Avenue Basin	47.568998 -122.606821	Port Washington Narrows
OF 8	Anderson Cove Basin	47.584747 -122.650852	Port Washington Narrows
OF 9	Anderson Cove Basin	47.580463 -122.645788	Port Washington Narrows
OF 10	Anderson Cove Basin	47.578889 -122.640556	Port Washington Narrows

OF 11	Anderson Cove Basin	47.578889o -122.639444o	Port Washington Narrows
OF 12	Anderson Cove Basin	47.578611o -122.636389o	Port Washington Narrows
OF 13	Warren Avenue Basin	47.578205o -122.630167o	Port Washington Narrows
OF 16	Pacific Avenue Basin	47.561667o -122.625278o	Sinclair Inlet
OF 17	Callow Avenue Basin	47.554167o -122.651111o	Sinclair Inlet

7) CSO Compliance Schedule

All CSO reduction projects have been completed and are currently in compliance with CSO reduction requirements as shown on the table below.

CSO REDUCTION COMPLIANCE REPORTING TABLE

CSO Site	Completion yr	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CSO events 20yr AVG
OF1	2000	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.15
OF2	2002	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20
OF3	2005	1	1	0	0	1	0	0	0	1	1	0	0	0	1	3	1	0	0	1	1	0.60
OF4	2003	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25
OF6	2005	1	1	1	1	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0	0	0.55
OF7A	2004	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25
OF7B	2004	1	1	1	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0.40
OF8	1999	1	1	0	1	0	0	0	2	1	0	0	1	1	0	0	0	1	0	0	0	0.45
OF9	2008	1	1	0	1	1	1	0	0	1	0	0	1	1	1	0	0	0	0	0	1	0.50
OF10	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	1	0.85
OF11	2008	1	1	0	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	3	0	1.10
OF12	1999	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.10
OF13	2002	1	1	1	0	0	1	1	0	1	1	1	1	0	1	0	0	1	0	1	0	0.60
OF16	2009	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.45
OF17	2003	1	1	1	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0.50

Pine Road Basin

Overflow 1 was completed in 2000 with the construction of in line storage and separation projects.

Stevens Canyon Basin

Overflow 2, with separation, in-line storage and the East Side Wet Weather Treatment Facility completion in 2002.

Cherry Avenue Basin

Overflow 3 is influenced by flows that come from OF7A and 7B and a restriction in the beach main just downstream from the OF site. The Cherry Avenue CSO reduction improvements included replacement of a portion of the gravity pressure main to eliminate a capacity bottleneck, and installation of cleaning access structures on the beach. This construction was completed in 2005.

East Park Basin

Overflow 4 projects included separation and flow diversions that were completed in 2003. This site has been in compliance since 2003.

Tracyton Beach Basin

Overflow 6 CSO reduction improvement for the Tracyton Beach Basin included an upgrade to pump station EB-6. Construction of this project began in 2004 and was completed in February, 2005.

Trenton Avenue Basin

Overflow 7A and 7 B, CSO Reduction was completed in the Trenton Avenue Basin by upgrading two pump stations, replacing a section of the beach forcemain, along with several flow diversions and stormwater separation. All necessary project components required to increase the capacity from this basin were completed in 2004.

Warren Avenue Basin

Overflow 13, the Warren Avenue basin CSO controls included decommissioning of OF 14 and stormwater separation that were constructed in 1996. OF 13 was still affected by high flow rates during storms until the East Side Wet Weather Treatment Facility was constructed and on-line in 2002.

Pacific Avenue Basin

Overflow 16, the Pacific Avenue basin, separation projects were completed in 2009. OF 15 was abandoned by the US Navy/PSNS in 1999.

Callow Avenue Basin

Overflow 17 projects were constructed in 5 phases beginning in 1997. The site was in compliance in 2004.

8) CSO activities in 2018

CSO event duration, volume, precipitation, and storm duration are shown in Attachment 2. CSO events, volumes and frequencies for 2018 are summarized in Attachments 3 through 6 in the appendices.

Average annual precipitation for 2018 was 46.87" as measured by a data logging tipping bucket rain station, located in Central Bremerton. This instrument records the date and time of every 0.01" of rain fall as it occurs.

All required collection system improvements to reduce CSOs were completed by the end of 2009. These projects have reduced and, at some locations, eliminated CSO events. These projects included: installation of new stormwater sewer mains, stormwater separation on private property, increased pumping and treatment capacity, increased wastewater treatment plant capacity, and a wet weather treatment facility. Bremerton is continually making upgrades to its collection and treatment systems, to ensure our ongoing CSO compliance. An important part of the reduction effort has been public relations and outreach to Bremerton's citizens and customers.

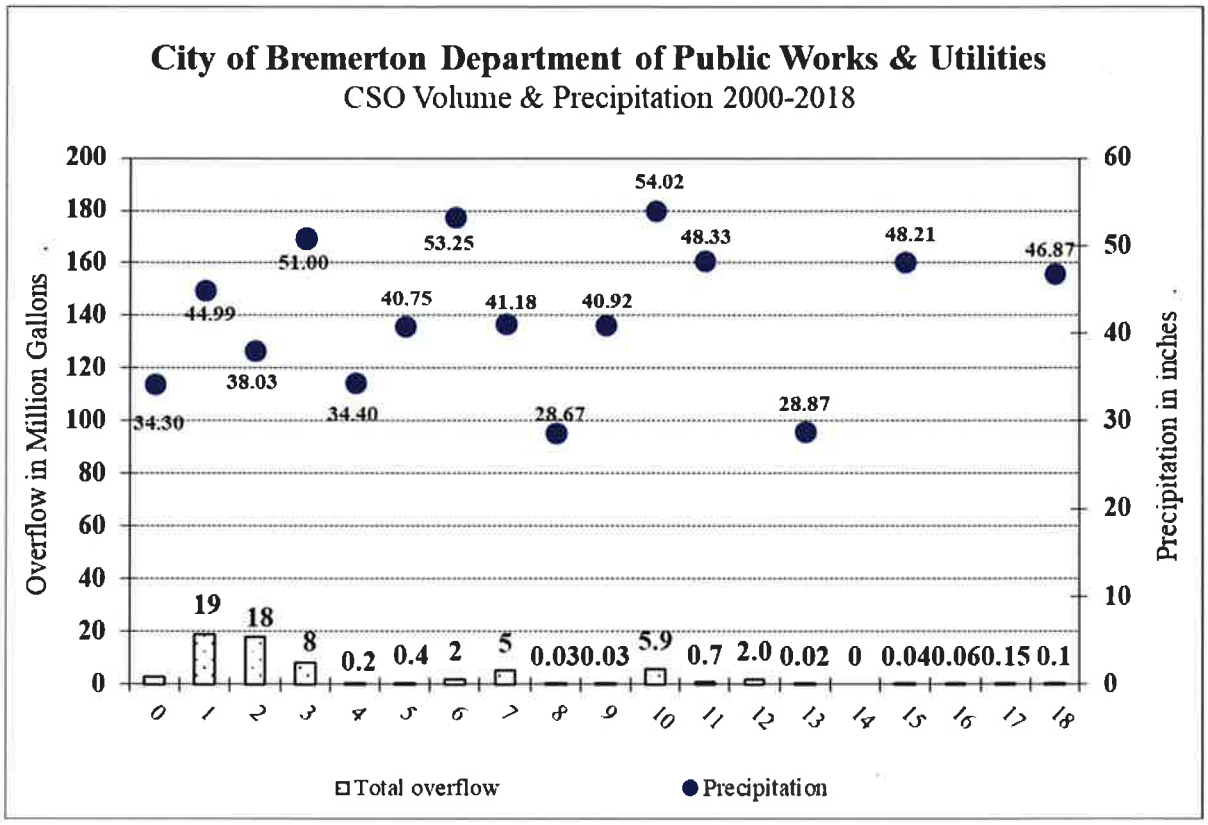


Figure 4 - CSO Volume and Precipitation for 2000-2018

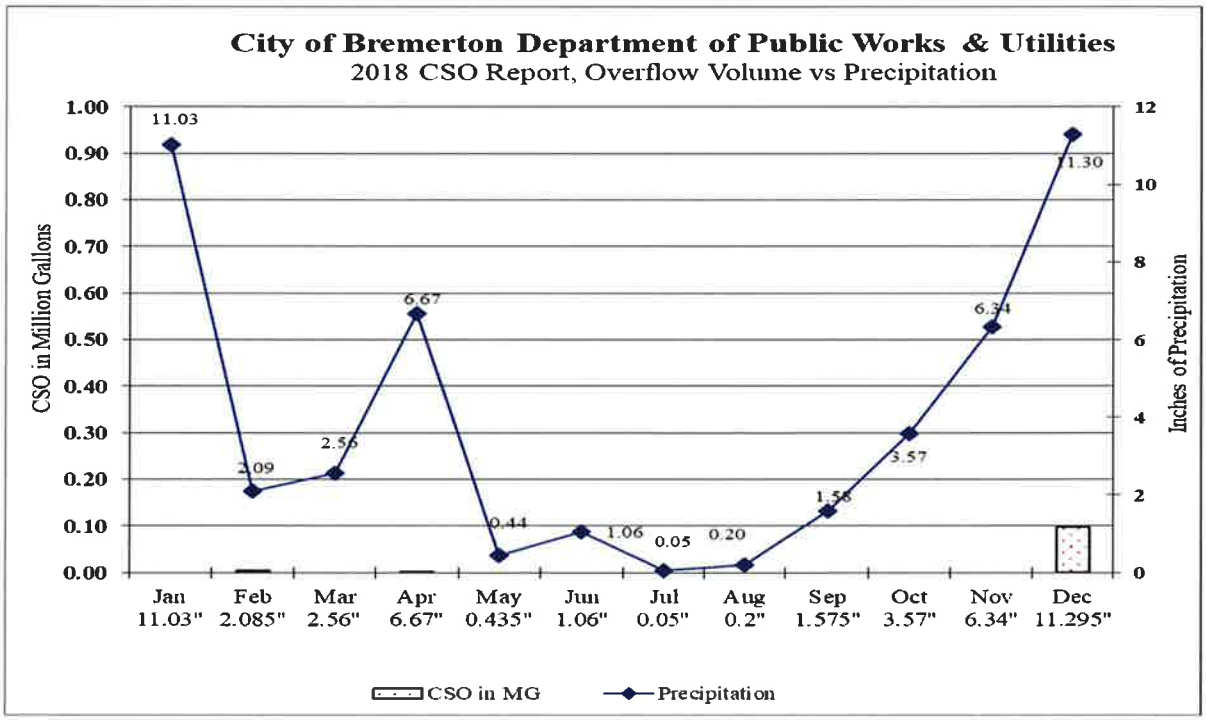


Figure 5 - Monthly Overflow Volume vs. Precipitation for 2018

Figure 6 shows each month's cumulative volume for all sites compared to baseline. In 2018, the annual overflow volume was below both the mean and the upper 95% confidence level baseline for all sites combined and individually.

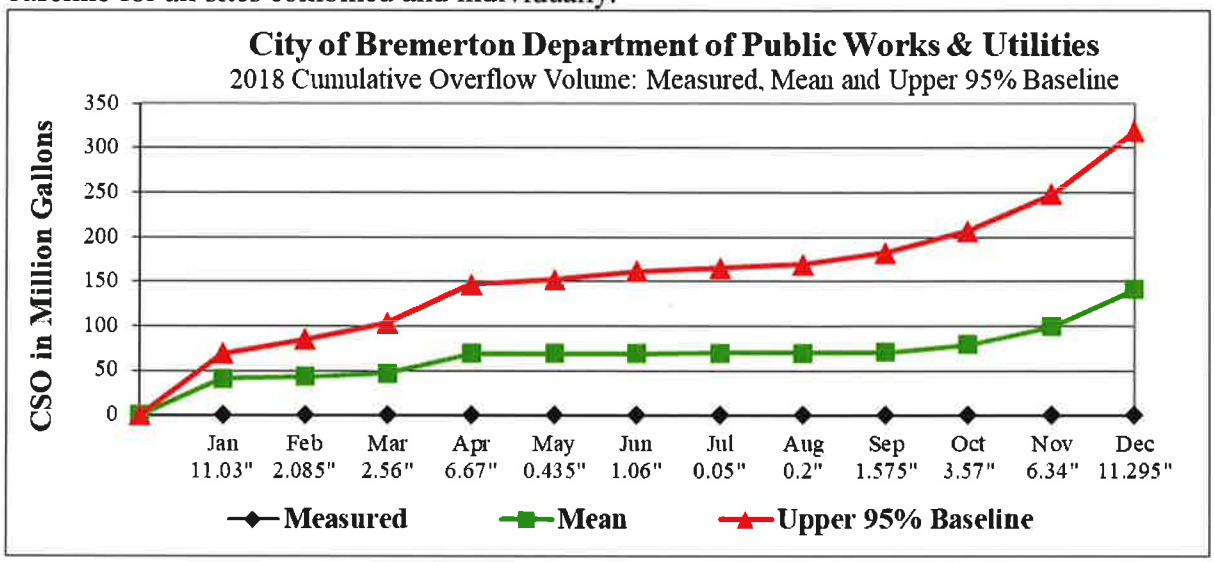


Figure 6 - Cumulative Overflow Volume for All Sites: Measured, Mean and upper 95% Baseline

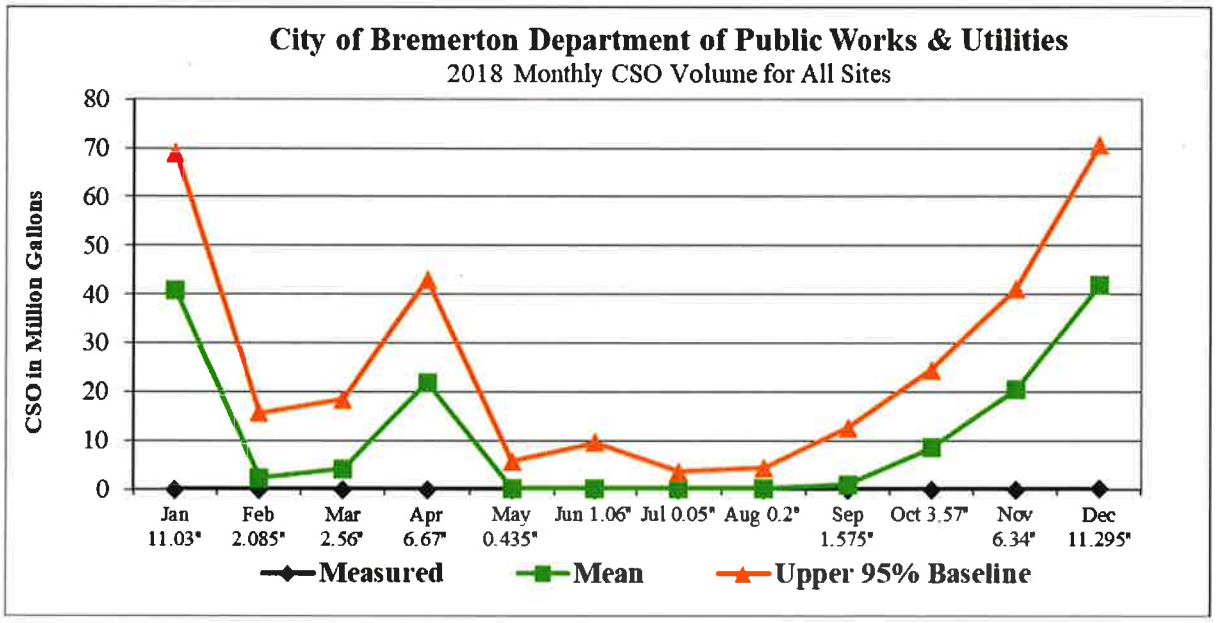


Figure 7 - Overflow Volume by Month for All Sites: Measured, Mean and Upper 95% Baseline

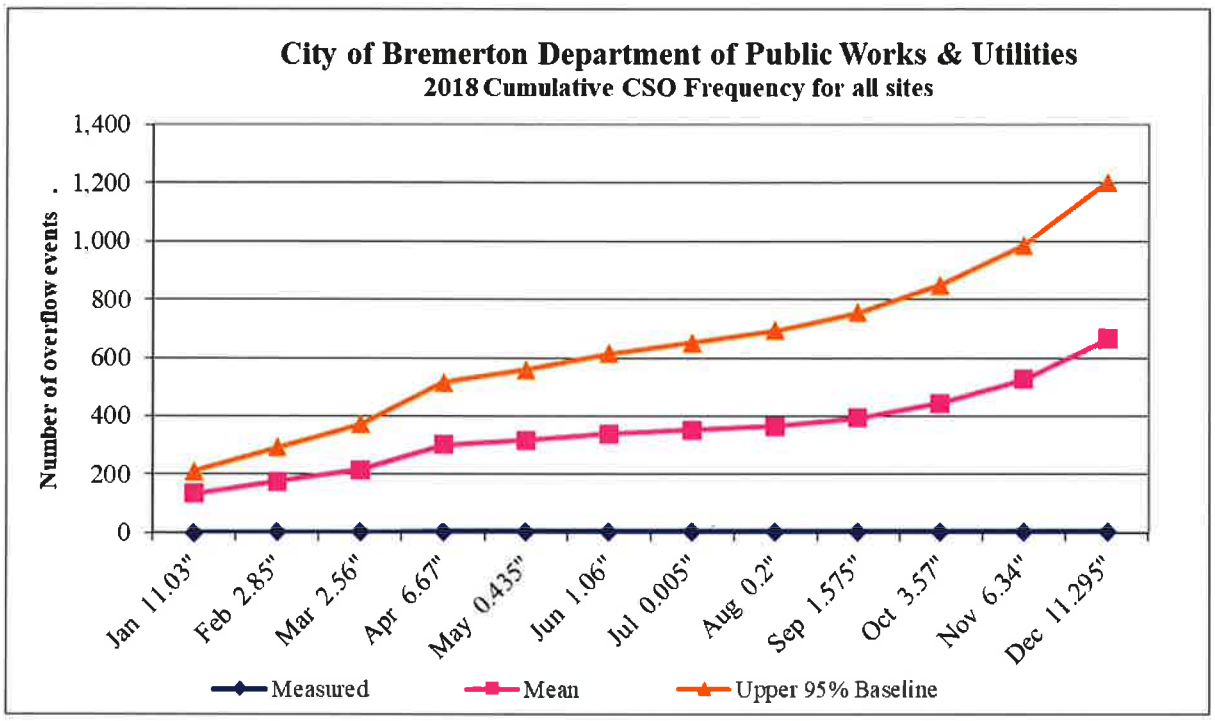


Figure 8 - Cumulative CSO Frequency for All Sites: Measured, Mean and Upper 95% Baseline

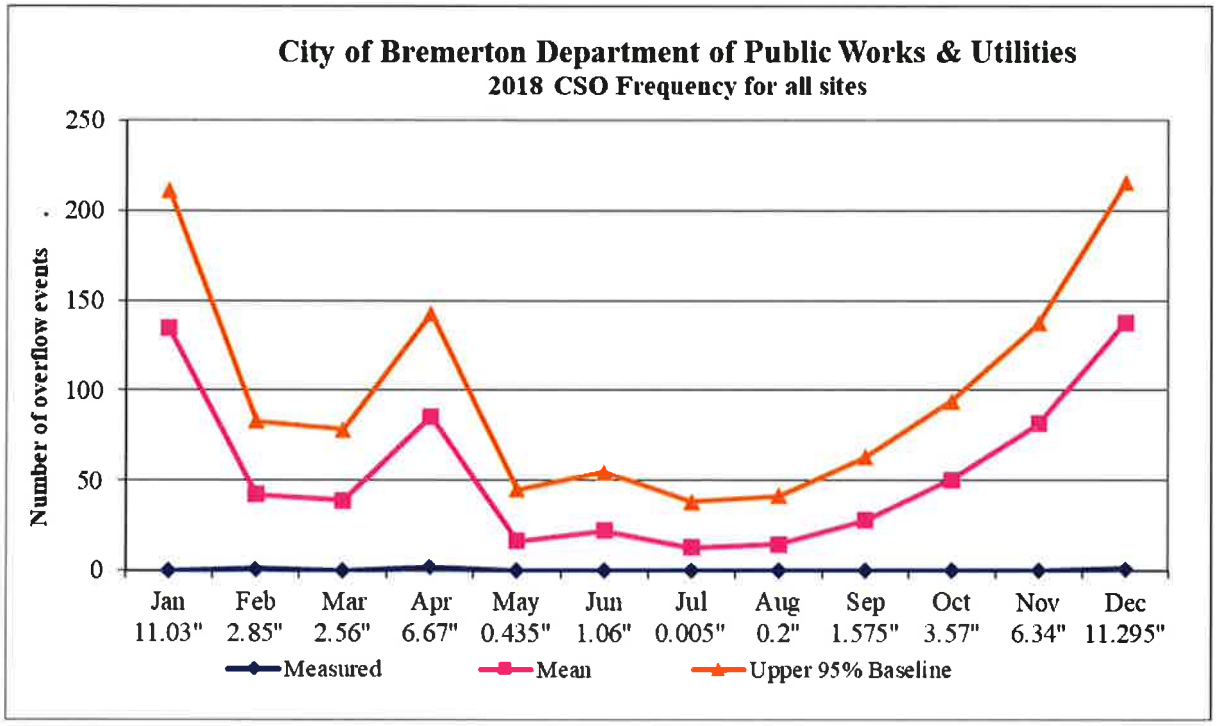


Figure 9 - Monthly CSO Frequency for All Sites: Measured, Mean and Upper 95% Baseline

9) CSO Program Cost to Reduction Comparison

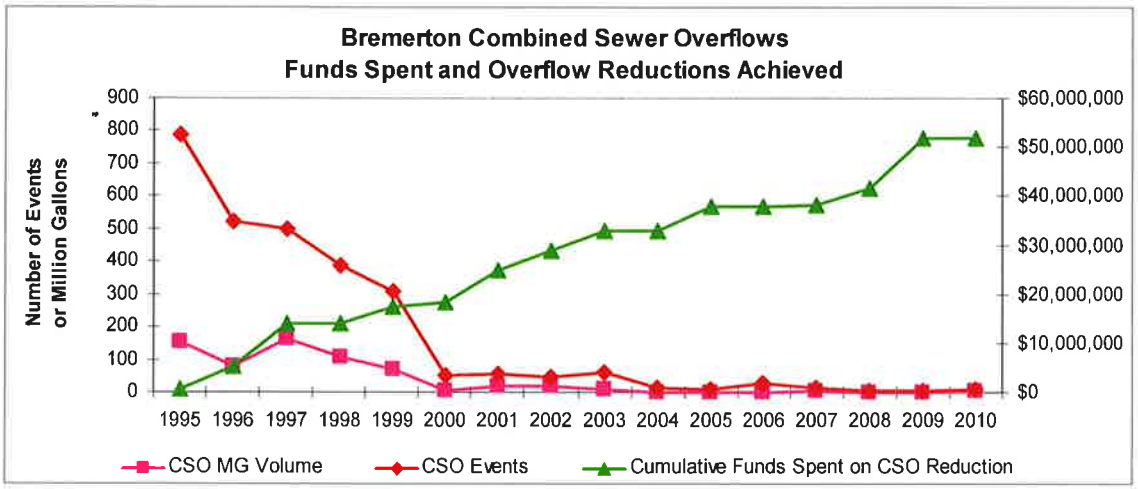


Figure 10 - Cost comparison per million gallons of CSO reduced

Bremerton achieved a 90% reduction in CSO events by 2000 at a cost of $18 Million. By 2004 a 97% reduction of CSO events was achieved for an additional $14.7 Million. The remaining $19.2 Million was spent to reduce the remaining 3% of CSO events to the regulatory limit and to build in extra system capacity to collect and treat storm events greater than the design storm.

10) Wastewater System Upgrades and Improvements

Bremerton is continually making upgrades to its collection and treatment systems to ensure ongoing CSO compliance. In 2018:

- 10,079 lineal feet of sewer mains and laterals were lined (CIPP) to prevent infiltration and inflow, in both East and West Bremerton.
- Multiple rain gardens were constructed in the Anderson Cove basin to reduce I & I
- Multiple manholes were pressure grouted to prevent infiltration.
- Multiple beach manholes were pressure grouted and lined to prevent saltwater intrusion.
- The beach sewer between High Ave. and Pump Station CW-1 (OF-10 & OF-11) was jetted and cleaned. This is being done annually.
- Currently out to bid – PS CW-4 Upgrades. This will remove 1000 lineal feet of gravity beach sewer; removing 15 private properties from the beach sewer system, by installing 7 grinder pump systems; and the elimination of OF-12. With the upgrade PS CW-4 will double in capacity and will have a back-up emergency generator.

11) Update of Wastewater Comprehensive Plan

Bremerton's Wastewater Comprehensive Plan update was completed and adopted by the Bremerton City Council on December 17, 2016. The Plan was submitted to the Washington Department of Ecology and approved on November 14, 2016. The Plan ensures existing and future wastewater capacity and plans for wastewater system improvements.

12) CMOM Program

The City of Bremerton is complying with capacity, management, operation, and maintenance (CMOM) requirements for the wastewater collection system. The collection system consists of sanitary sewer laterals, sanitary sewer mains, wastewater pump stations, and the Eastside CSO Treatment Facility.

The City has completed smoke testing in older areas of Bremerton and documented deficiencies on private property and City right-of way pipelines. Corrective action has included contact with property owners and repair/replacement within the City's area of responsibility.

Sanitary sewer main inspections including smoke testing, hydraulic pressure, and TV camera are regularly completed. Serious deficiencies are corrected as they are found with subsequent actions addressed in the City's Wastewater Comprehensive Plan.

Wastewater pump station improvements have significantly increased the reliability of the conveyance system. Improvements include construction upgrades to existing pump stations, installation of new control systems, dry-pit submersible pumps, emergency power generation systems, and new telemetry hardware and software systems. The City's pumping capacity to the WWTP has increased by 10,000 gpm. The Eastside CSO Treatment Plant (ESTP) activates during high precipitation events. Completed system improvements will help reduce the number of startup events at the ESTP.

13) ENVVEST

The City partnered with the Puget Sound Naval Shipyard and other stakeholders (Suquamish Tribe, Department of Health, Kitsap County Public Works, Kitsap County Health District, EPA, and Department of Ecology) to be part of the Navy's ENVVEST project in Sinclair and Dyes Inlets. Bremerton shared CSO, rainfall, water quality and stream flow data and assisted with the modeling, CSO and stormwater sampling efforts. Following is an excerpt from the Executive Summary of the Technical Master Plan *(November 26, 2001)* detailing the purpose of the agreement:

> *"The U.S. Navy Puget Sound Naval Shipyard (PSNS), Region X of the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) have entered into an agreement to protect and improve the health of surface waters of Sinclair and Dyes Inlets and surrounding watershed by developing a more environmentally protective strategy for managing pollutant sources in the Inlets than the regulatory framework that is currently in place. This technical work master plan defines the goals, objectives, and technical approach planned for Phase I of the PSNS Project **ENV**ironmental In**VEST**ment (ENVVEST). Based on inputs from regulatory requirements, stakeholder involvement, community concerns, and available resources, the technical work master plan has been developed to meet the project goals and milestones defined by the ENVVEST Project Management Team.*

An approach to develop multi-parameter and multimedia TMDLs and assess ecological risk at the watershed scale is being conducted to develop and demonstrate alternative strategies for protecting and improving the ecological integrity of Sinclair and Dyes Inlets. The watershed-based assessment is evaluating environmental problems at the proper scale, providing an integrated framework for cooperative studies with stakeholders and partners, and developing linkages between problems and management options. The studies are providing data to address key issues identified by the working groups, improving the understanding of how the ecosystem functions, and increasing the ability to solve environmental problems. The Technical Working Groups are fostering partnering among stakeholders and establishing the technical and scientific basis to better protect and improve the health of the watershed."

Project ENVVEST developed a water quality model that defined the impacts of CSOs and other inputs on local water quality in Sinclair and Dyes Inlets. The model shows that potential impact of CSOs to shellfish beds in Dyes Inlet is minimal. **This modeling effort provided the Washington State Department of Health with information needed to reopen several shellfish beds in Dyes Inlet to harvesting in 2003.** The model was calibrated using data collected in the field, which involved a drogue study, current/flow monitoring, general water quality analysis, and a dye release study from the ESTP. The model shows that shellfish beds are not impacted during a CSO event.

14) Funding

The City has expended over $50 Million dollars to complete the CSO Reduction program over the past 19 years. Outside sources of funds were obtained wherever possible, and included the following:

- 12 Public Works Trust Fund Loans totaling $19,700,000,
- 20 State Revolving Fund Loans totaling $13,900,000,
- 3 Centennial Grants totaling $294,000,
- 4 State and Tribal Assistance Grants totaling $7,200,000.

15) Compliance with Nine Minimum Controls

Compliance with the Nine Minimum Controls, required by the EPA CSO Policy, is determined by professional judgment of the NPDES control authority, the Department of Ecology. The City's efforts to comply with these controls are described below.

PROPER OPERATION AND MAINTENANCE

The City's WWTP has a written operations and maintenance manual and a computerized maintenance management program. Adequate funding is budgeted for these activities. An emergency response procedure is in place. The City is in compliance with the CMOM regulations.

MAXIMIZATION OF COLLECTION SYSTEM STORAGE

Collection system components are properly operated, maintained, and inspected to ensure adequate capacity and reliability. In 1996, the City started an on-going evaluation and optimization program that started when overflow weirs were raised to increase use of available storage in the collection system. The City inspects and maintains sewer lines to reduce flow obstructions and continually upgrades and optimizes lift stations to improve pumping capacities.

REVIEW OF PRETREATMENT REQUIREMENTS

Ecology administers the City's industrial pretreatment program. In 1996, Ecology finalized local limits for metals and coordinated the issuance of a waste discharge permit for the Puget Sound Naval Shipyard. PSNS is currently the only significant discharger identified by Ecology in the City's system. The City monitors and samples the influent flows from PSNS and in manholes in commercial areas to track non-domestic discharges.

MAXIMIZATION OF FLOW TO THE WWTP

The Bremerton Westside Wastewater Treatment Plant is able to process all of the wastewater it receives. The Westside WWTP received approval from Ecology and has been rerated to a maximum month capacity of 15.5 MGD during the wet season months (November – April) and a maximum month capacity of 11.0 MGD during the dry season months (May – October). The new rerating parameters were implemented into the 2013 NPDES Permit.

Pump station reliability has been improved with the integration of new control systems, scheduled cleaning and maintenance of the wetwells, and systematic replacement of existing long shaft pump assemblies with close-coupled dry-pit submersibles. The initial replacement effort was on smaller stations, and the City has begun to replace pump assemblies in the larger stations.

ELIMINATION OF DRY WEATHER CSOs

Bremerton has no issues with dry weather CSOs. A few CSO locations also serve as emergency overflows for wastewater pump stations.

FLOATABLE CONTROL

No evidence exists to indicate issues with floatables from Bremerton CSO sites. The City has greatly improved catch basin and street cleaning activities over the past several years. All major City streets are swept every 6 to 10 weeks with special attention to commercial areas once each week. All City catch basins are cleaned annually.

POLLUTION PREVENTION PROGRAMS

The City, in addition to state and other local agencies, uses public education programs and materials to provide customer outreach on pollution prevention. Businesses are contacted through the ongoing cross connection and Stormwater IDDE (Illicit Discharge & Detection & Elimination) programs. Bremerton responds to reports of improper waste disposal into the storm and sanitary sewer systems and coordinates these activities with Ecology. The City has

an active grease trap and water conservation program. The above-mentioned catch basin and street cleaning program also reduce contaminants in CSOs and stormwater discharges.

Kitsap County has an effective pollution prevention program through the Solid Waste Division of the County Public Works Department and the Solid Waste Program at the Bremerton-Kitsap County Health District. Most residents and businesses are actively recycling. In 1996 the County opened its Moderate Risk Waste Facility to handle dangerous waste from homes and small generators. Bremerton is an active participant in the "West Sound Stormwater Outreach Group" (WSSOG), since 2001, that provides pollution prevention information through brochures, web page information, and newspaper ads. The purpose of the WSSOG is to work collaboratively to ensure compliance with the stormwater NPDES Phase II permit requirements targeting public outreach and involvement.

The WSSOG surveyed Kitsap Peninsula residents to generate a baseline of awareness and behaviors that will assist with the prioritization of outreach campaigns. The City and County both publicize hotline telephone numbers for public reporting of spills and other illicit discharges.

Bremerton maintains an internet website located at bremertonwa.gov that provides pollution prevention, CSO, and water conservation information to a wide variety of interested cities, organizations and people. In 2018 there were more than 70,000 visits from more than 25 different countries and various agencies.

PUBLIC NOTIFICATION

CSO discharge to marine waters is the main public health concern for shellfish harvesting. To meet the needs of the Washington State Department of Health & Shellfish program, a notification procedure was implemented in 2003 after several beds in Dyes Inlet were re-opened for harvesting. The Bremerton-Kitsap County Health District also posts these areas when a CSO event occurs. The City's "Cooperative Approach to CSO Reduction" program educates residents through a multi-media approach using brochures and the web site, bremertonwa.gov that explains CSO's with detailed animations.

MONITORING TO CHARACTERIZE CSO IMPACTS

CSO Water Quality Monitoring began in 1995 and ended in 2010. Samples were collected, analyzed and logged based on the water year, October to September. The City also coordinated monitoring efforts with the Navy ENVVEST project described above.

16) CSO/WW System Upgrades Planned for 2018

All capital improvements included in the CSO Reduction Plan and associated amendments have been constructed. The City will continue to monitor system flows, and will consider additional system upgrades as the need arises.

17) Eastside Plant Yearly Averages

Listed below are the yearly averages of TSS removal efficiencies and effluent settleable solids for the 2018 reporting period. This is a requirement of the NPDES Waste Discharge Permit.

Eastside Plant Yearly Information

Year : 2018

Month	Influent TSS	Influent Settleable Solids	Effluent TSS	Effluent Settleable Solids	TSS % Removal	Influent BOD	Effluent BOD	Influent pH	Effluent pH	Fecal Coliform
11-Jan	138	2.8	12	0.01	67	83	27	6.96	6.81	67
18-Jan	184	0.8	9	0.01	46	50	27	7.02	6.98	75
23-Jan	166	0.4	31	0.01	56	68	30	6.92	6.96	11
24-Jan	48	0.8	17	0.01				7.01	6.9	
27-Jan	34	0.7	7	0.04	55	29	13	6.86	6.85	20
29-Jan	150	0.8	6	0.01	77	92	21	6.90	6.84	15
14-Apr	70	0.09	2	0.001	46	116	63	7.03	7.07	17
14-Apr		0.05		0.01				7.00	6.89	
28-Apr	186	0.04	20	0.001	36	97	62	7.34	7.19	12
27-Oct	332	1	22	0.02	93	194	84	6.76	6.83	191
26-Nov	154	0.6	13	0.1	92	157	90	6.84	6.8	10
11-Dec	144	3	6	0.05	66	73	25	6.92	6.87	37
17-Dec	96	3	9	0.1	75	73	18	6.56	6.61	48
20-Dec	108	1.5	10	0.1	72	65	18	6.67	6.60	10
Averages	**139.23**	**1.11**	**12.62**	**0.03**	**65.08**	**91.42**	**39.83**	**6.91**	**6.87**	**42.75**

18) Attachments to 2018 CSO Report

1. Map of Bremerton CSO Sites
2. 2018 CSO Event Report
3. 2018 Overflow Volume Data
4. 2018 Cumulative Overflow Volume Measured, Mean and Upper 95%
5. 2018 CSO Frequency Measured, Mean and Upper 95% Confidence Interval
6. 2018 Cumulative Overflow Frequency Measured, Mean and Upper 95% Confidence Level

19) References

1. City of Bremerton CSO Plan, 1992, and Update, 2000
2. City of Bremerton Baselines Review and Recommendations, 1996
3. City of Bremerton Final Report: CSO Water Quality Characterization Study, 1997
4. EPA Guidance for Nine Minimum Controls, 1995
5. Washington Department of Ecology Guidance for Chapter 173-245 WAC, 1990
6. Puget Sound Naval Shipyard Project ENVVEST Technical Work Master Plan, May 2002
7. NOAA Atlas 2, Precipitation, Western United States, Volume IX, Washington
8. City of Bremerton Wastewater Comprehensive Plan Update, 2005

20) Certification

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

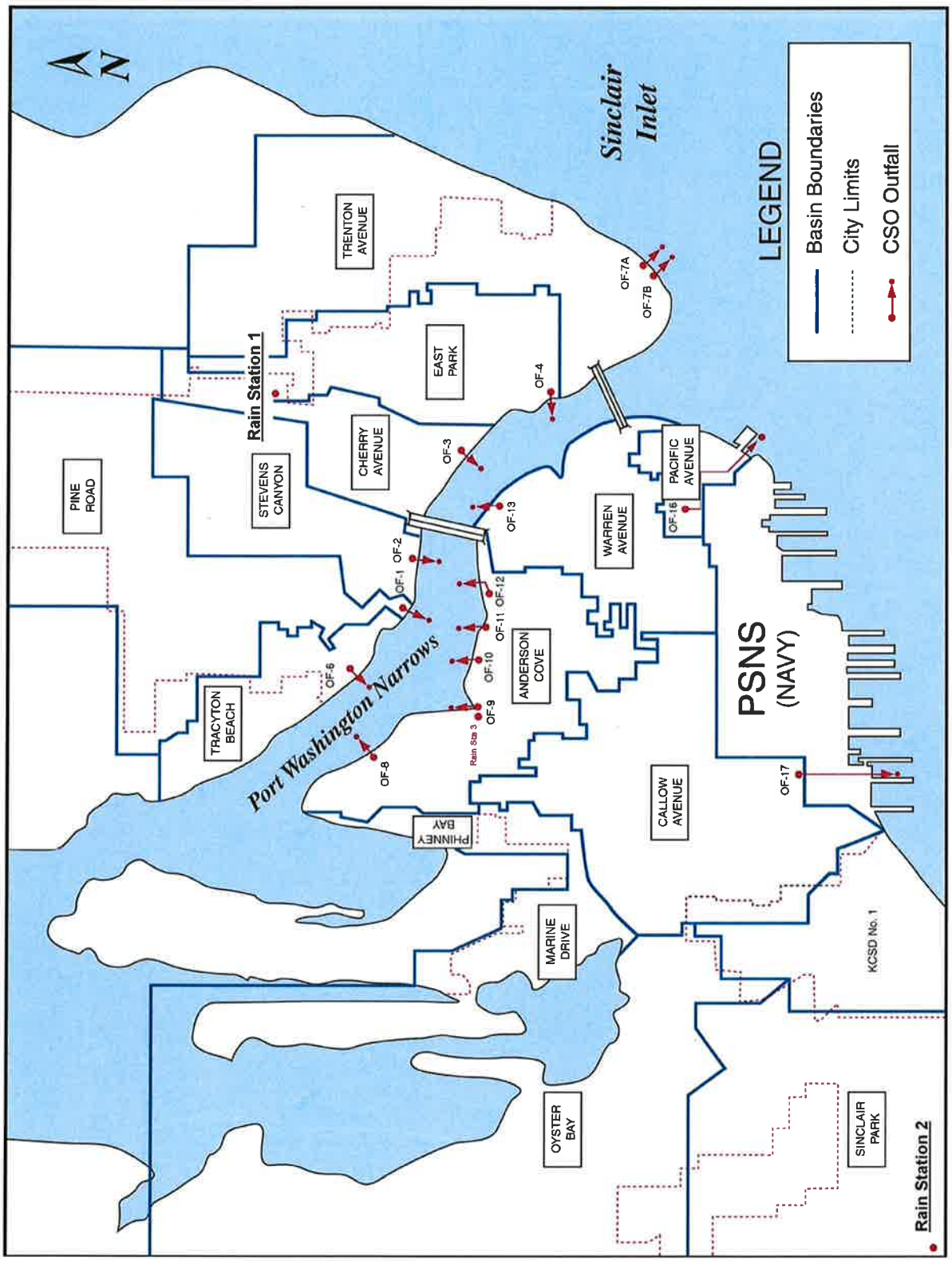
Signed by:

Thomas Knuckey, Director of Public Works & Utilities
Interim

5/8/19
Date

ATTACHMENT 1

Map of Bremerton CSO Sites


N
Sinclair Inlet
LEGEND
Basin Boundaries
City Limits
CSO Outfall
Rain Station 1
Rain Station 2
Rain Sta 3
TRENTON AVENUE
EAST PARK
CHERRY AVENUE
STEVENS CANYON
PINE ROAD
TRACYTON BEACH
Port Washington Narrows
PHINNEY BAY
MARINE DRIVE
OYSTER BAY
ANDERSON COVE
WARREN AVENUE
PACIFIC AVENUE
CALLOW AVENUE
PSNS
(NAVY)
KCSD No. 1
SINCLAIR PARK
OF-1
OF-2
OF-3
OF-4
OF-6
OF-7A
OF-7B
OF-8
OF-9
OF-10
OF-11
OF-12
OF-13
OF-16
OF-17

ATTACHMENT 2

2018 CSO Event, Duration, Volume, Precipitation, Storm Duration

NPDES	Outfall #	Facility Name	Receiving Water	Event Starting Date	Duration (hours)	Volume (gallons)
WA0029289	9	Bremerton WWTP	Port Washington Narrows	2/18/2018	0.15	4,109
WA0029289	3	Bremerton WWTP	Port Washington Narrows	4/28/2018	0.16	600
WA0029289	10	Bremerton WWTP	Port Washington Narrows	4/28/2019	0.016	300
WA0029289	1	Bremerton WWTP	Port Washington Narrows	12/11/2018	0.58	98,000

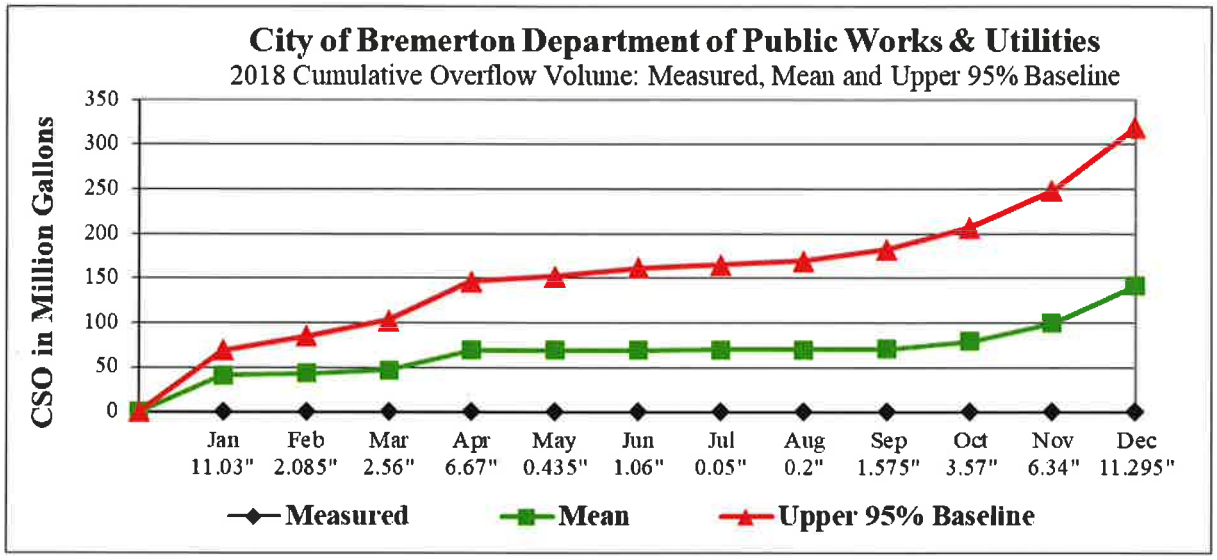
ATTACHMENT 3

Overflow Volume Data for 2018

2018	AVG.	OVERFLOW VOLUME IS SHOWN IN GALLONS															
	Precip	O/F 1	O/F 2	O/F 3	O/F 4	O/F 6	O/F 7A	O/F 7B	O/F 8	O/F 9	O/F 10	O/F 11	O/F 12	O/F 13	O/F 16	O/F 17	Total
January	11.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	2.09	0	0	0	0	0	0	0	0	4,109	0	0	0	0	0	0	4,109
March	2.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	6.67	0	0	600	0	0	0	0	0	0	300	0	0	0	0	0	900
May	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
eptember	1.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	3.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	6.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
December	11.30	98,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98,000
TOTAL	46.87	98,000	0	600	0	0	0	0	0	4,109	300	0	0	0	0	0	103,009

ATTACHMENT 4

2018 Cumulative Overflow Volume Measured, Mean and Upper 95% Confidence Level


City of Bremerton Department of Public Works & Utilities
2018 Cumulative Overflow Volume: Measured, Mean and Upper 95% Baseline
CSO in Million Gallons
350
300
250
200
150
100
50
0
Jan 11.03"
Feb 2.085"
Mar 2.56"
Apr 6.67"
May 0.435"
Jun 1.06"
Jul 0.05"
Aug 0.2"
Sep 1.575"
Oct 3.57"
Nov 6.34"
Dec 11.295"
Measured
Mean
Upper 95% Baseline

ATTACHMENT 5

2018 Combined Sewer Overflow Report
Overflow Frequency Data
Measured, Mean and Upper 95% Confidence Interval

Overflow Frequency Data

CSO event count is based on a 24 Hr inter-event period. Associated Mean and Upper 95% baselines are shown for comparison

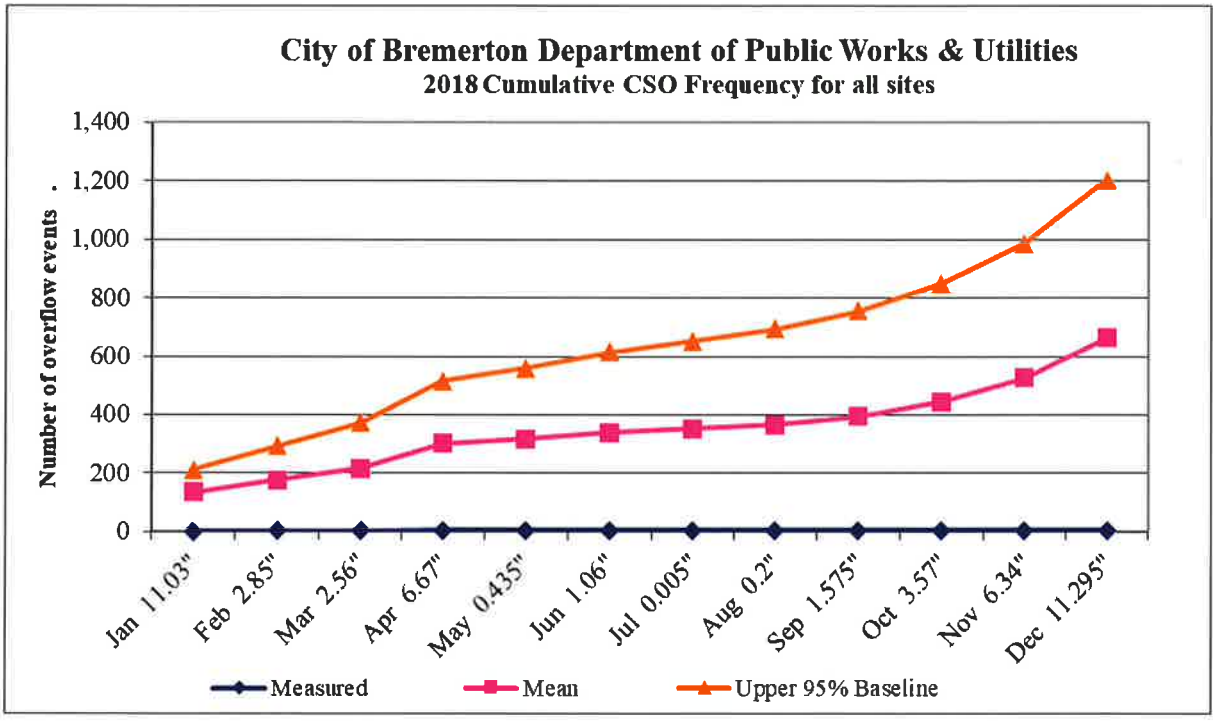
	Measured Rainfall	Measured OF-1	Measured OF-2	Measured OF-3	Measured OF-4	Measured OF-6	Measured OF-7A	Measured OF-7B	Measured OF-8	Measured OF-9	Measured OF-10	Measured OF-11	Measured OF-12	Measured OF-13	Measured OF-16	Measured OF-17	Totals
January	11.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	2.09	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
March	2.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	6.67	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2
May	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	1.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	3.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	6.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
December	6.34	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	41.87	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	4

	Measured Rainfall	Mean OF-1	Mean OF-2	Mean OF-3	Mean OF-4	Mean OF-6	Mean OF-7A	Mean OF-7B	Mean OF-8	Mean OF-9	Mean OF-10	Mean OF-11	Mean OF-12	Mean OF-13	Mean OF-16	Mean OF-17	Totals
January	11.03	6	5	12	25	6	5	3	11	11	8	2	12	9	1	16	135
February	2.09	1	1	4	9	2	1	1	2	2	3	0	6	2	0	6	42
March	2.56	1	1	4	8	2	1	1	2	2	2	0	6	2	0	6	39
April	6.67	4	3	8	17	4	3	2	6	6	5	1	9	6	0	11	85
May	0.44	0	0	2	4	0	0	0	0	0	1	0	4	0	0	3	16
June	1.06	0	1	2	5	1	1	1	0	0	1	0	5	1	0	4	22
July	0.01	0	0	1	3	0	0	0	0	0	1	0	4	0	0	3	13
August	0.20	0	0	1	4	0	0	0	0	0	1	0	4	0	0	3	14
September	1.58	0	1	3	6	1	1	1	1	1	2	0	5	1	0	5	28
October	3.57	2	2	5	10	2	2	1	3	3	3	0	7	3	0	7	50
November	6.34	4	3	7	16	3	3	2	6	6	5	1	9	5	0	11	82
December	6.34	7	5	12	26	6	6	3	12	12	9	2	12	9	1	17	138
Total	41.87	25	24	59	135	27	24	17	44	43	42	8	83	40	4	91	663

	AVG Rainfall	Upper 95% OF-1	Upper 95% OF-2	Upper 95% OF-3	Upper 95% OF-4	Upper 95% OF-6	Upper 95% OF-7A	Upper 95% OF-7B	Upper 95% OF-8	Upper 95% OF-9	Upper 95% OF-10	Upper 95% OF-11	Upper 95% OF-12	Upper 95% OF-13	Upper 95% OF-16	Upper 95% OF-17	Totals
January	11.03	9	8	15	38	9	10	5	15	15	15	4	27	14	2	25	211
February	2.09	3	3	6	16	3	4	2	4	4	6	1	15	5	1	11	83
March	2.56	2	3	5	15	3	3	2	4	4	6	1	15	4	1	10	78
April	6.67	5	5	10	26	6	6	3	9	9	10	2	21	9	1	18	143
May	0.44	1	1	3	9	2	2	1	1	1	3	0	11	2	1	7	45
June	1.06	1	2	4	11	2	2	1	2	2	4	0	12	3	1	8	55
July	0.01	0	1	2	8	2	2	1	1	0	3	0	11	2	1	6	38
August	0.20	0	1	3	8	2	2	1	1	1	3	0	11	2	1	6	41
September	1.58	2	2	4	12	3	3	1	3	2	5	1	13	3	1	9	63
October	3.57	3	3	6	18	4	4	2	5	5	7	1	16	6	1	12	94
November	6.34	5	5	10	25	6	6	3	9	9	10	2	20	9	1	17	137
December	6.34	9	8	16	39	9	10	5	16	16	15	4	28	14	2	26	215
Total	41.87	41	41	83	226	51	54	26	71	67	87	16	201	72	14	153	1,203

ATTACHMENT 6

2018 Cumulative Overflow Frequency Measured, Mean and Upper 95% Confidence Level


City of Bremerton Department of Public Works & Utilities
2018 Cumulative CSO Frequency for all sites
Number of overflow events
1,400
1,200
1,000
800
600
400
200
0
Jan 11.03"
Feb 2.85"
Mar 2.56"
Apr 6.67"
May 0.435"
Jun 1.06"
Jul 0.005"
Aug 0.2"
Sep 1.575"
Oct 3.57"
Nov 6.34"
Dec 11.295"
Measured
Mean
Upper 95% Baseline